

What is claimed is:

1. An automated method for analyzing substances containing cellular material, the method comprising the steps of:

activating a test apparatus having at least one liquid jetting device to dispense a first defined volume containing at least one potential pharmaceutically active agent into contact with a defined volume of a substance containing cellular material; and

capturing data pertaining to changes detected in the defined volume of the substance containing cellular material triggered by introduction of the first defined volume.

2. The automated method of claim 1 wherein the jetting device comprises at least one cartridge containing at least one potential pharmaceutically active agent removably associatable with the jetting device.

3. The automated method of claim 1 wherein the defined volume of the substance containing cellular material is maintained in contact with a suitable testing substrate, the suitable testing substrate having a contact surface which is reactively inert to interaction with the cellular material under study.

4. The automated method of claim 3 wherein the defined volume of the substance containing cellular material comprises a plurality of individual volumes, wherein each individual volume is between about 1 and about 500 picoliters and wherein characteristics of the substance containing cellular material may vary from individual volume to individual volume in a known predetermined manner.

5. The automated method of claim 4 wherein the at least one jetting device dispenses varying quantities of at least one potential pharmaceutically active agent into contact with the individual volume of the substance containing cellular material.

6. The automated method of claim 4 wherein the at least one jetting device dispenses a quantity of at least one potential pharmaceutically active agent into contact with selected individual volumes present, the dispensed quantity varying compositionally across the individual volumes of the substance containing cellular material.

7. The automated method of claim 1 wherein the defined volume of a substance containing cellular material is present as a plurality of individual samples arranged in an array capable of yielding statistically viable data.

8. The automated method of claim 7 wherein the individual samples are arranged in a defined two-dimensional array.

9. The automated method of claim 7 wherein the individual samples are arranged in an iterative linear array.

10. The automated method of claim 1 further comprising the step of interactively activating at least one second liquid jetting device to dispense a second defined volume of a potential chemically active substance into contact with the defined volume of the substance containing cellular material.

11. A test apparatus for ascertaining effects of at least one potential pharmaceutically active agent on a substance containing cellular material, the test apparatus comprising:

a test surface configured to receive at least one discrete volume of the substance containing cellular material; and
at least one automated drop on demand liquid ejection device capable of administering at least one potential pharmaceutically active agent into contact with the discrete volume of the substance containing cellular material present on the receiving means.

12. The test device of claim 11 wherein the test surface has at least one face adapted to receive the substance, the receiving face composed of a material which is essentially non-reactive with the substance positioned thereon.

13. The test device of claim 12 wherein the planar surface has defined therein a plurality of receiving positions configured in an arrayed pattern.

14. The test device of claim 11 wherein further comprising a controller coupled to the drop on demand liquid ejection device to provide controlled deposition of the potential pharmaceutically active agent into contact with the substance containing cellular material.

15. The test device of claim 14 wherein the drop on demand liquid ejection device is an electronically actuated printhead.

16. The test device of claim 15 wherein the electronically actuated printhead includes at least one multichamber printhead, the multichamber printhead in fluid communication with a reservoir containing at least one potential pharmaceutically active agent.

17. The test device of claim 16 wherein the reservoir containing at least one potential pharmaceutically active agent is a cartridge removably positionable in fluid contact in the test device, the cartridge maintaining the at least one potential pharmaceutically active agent in discrete and isolated position therein until positioned relative to the test device.

18. The test device of claim 14 further comprising:

at least one detection device, the detection device capable of ascertaining detectable changes in the discrete volume of the substance containing cellular material subsequent to introduction of the potential pharmaceutically active agent; and

at least one data capture device, the data capture device capable of recording data pertaining to the material dispensed from the drop on demand liquid ejection device, wherein the data capture device is in communication with the multichamber printhead.

19. A replaceable cartridge component for use in a test apparatus for ascertaining effects of at least one potential pharmaceutically active agent on a biological substance, the test apparatus including at least one drop on demand liquid ejection device the replaceable cartridge comprising:

a container having an interior volume containing at least one pharmaceutically active agent; and

a printhead in fluid communication with the container, the printhead capable of dispensing the at least one pharmaceutically active agent in the container.

20. The replaceable cartridge component of claim 19 further comprising at least one memory storage device capable of capturing and maintaining information pertaining to cartridge function and contents and communicating said captured information to the test apparatus.

21. The replaceable cartridge component of claim 20 further comprising control electronics, the control electronics capable of converting received information into control output pertinent to at least one aspect of the effect analysis.

22. A replaceable cartridge component for use in a test apparatus for ascertaining effects of at least one potential pharmaceutically active

agent on a biological substance, the test apparatus including at least one drop on demand liquid ejection device the replaceable cartridge comprising:

a container having an interior volume containing at least one pharmaceutically active agent; and

a memory storage device, the memory storage capable of storing information pertinent to at least one aspect of test apparatus function.

23. The replaceable cartridge component of claim 22 wherein the information stored in the memory storage device comprises data pertaining to cartridge function and contents.

24. The replaceable cartridge of claim 22 further comprising a printhead in fluid communication with the container, the printhead capable of dispensing the at least one pharmaceutically active agent in the container.

25. A method for performing arrayed analysis on a biologically derived material containing cellular material, the method comprising the steps of:

activating at least one drop on demand liquid ejection device to dispense a defined volume containing at least one potential pharmaceutically active agent into contact with a plurality of defined volumes of a substance containing cellular material;

capturing data pertaining to changes detected in the defined volume of the substance containing cellular material triggered by introduction of the first defined volume into each defined volume containing cellular material for suitable review and interpretation; and

upon interpretation of the captured data, altering dispensation of the potential pharmaceutically active material in an iterative manner.

26. The method for performing arrayed analysis of claim 25 wherein the iterative variation is a function of an ongoing factorial analysis protocol.